WHAT IS CLAIMED IS:

1. A mass analysis system comprising:

an ion injector adapted to provide a plurality of ions for analysis;

an ion selection chamber adapted to receive the plurality of ions from the ion injector,

the ion selection chamber having

an outer electrode, and

a plurality of inner electrodes, the plurality of ions being accepted from the ion injector into the interstitial region between the outer electrode and the plurality of inner electrodes; and

a power supply system connected to the electrodes of the ion selection chamber and adapted to provide an oscillating voltage to at least one of the plurality of inner electrodes to facilitate separation of ions of a selected mass-to-charge ratio from ions of non-selected mass-to-charge ratios based on the orbital periods of said plurality of ions through said interstitial region.

2. A mass analysis system as claimed in claim 1 wherein said power supply system operates to initially direct said plurality of ions into a stable trajectory in said interstitial region.

3. A mass analysis system as claimed in claim 2 wherein said oscillating voltage provided by said power supply system destabilizes the orbital trajectory of ions of non-selected mass-to-charge ratios while concurrently maintaining ions of said selected mass-to-charge ratio in a stable orbital trajectory.

4. A mass analysis system as claimed in claim 3 wherein said oscillating voltage provided by said power supply system is variable to destabilize the trajectory of ions of the selected mass-to-charge ratio after destabilization of the trajectory of ions of non-selected mass-to-charge ratios.

5. A mass analysis system as claimed in claim 4 and further comprising an ion detector disposed to detect ions of the selected mass-to-charge ratio.

6. A mass analysis system as claimed in claim 5 wherein said ion detector comprises said outer electrode.

7. A mass analysis system as claimed in claim 1 wherein said oscillating voltage is a DC switched voltage.

8. A mass analysis system as claimed in claim 4 wherein said oscillating voltage is a DC switched voltage.

9. A mass analysis system as claimed in claim 1 wherein said plurality of inner electrodes comprises:

a first generally cylindrical inner electrode having at least one arcuate gap disposed along a length thereof;

a second inner electrode extending generally coextensive with said arcuate gap of said first inner electrode, the first and second inner electrodes and said outer electrode cooperating to form a substantially circular ion trajectory path in the interstitial region between said outer electrode and said inner electrodes.

10. A mass analysis system as claimed in claim 9 wherein said oscillating voltage is a DC switched voltage.

11. A mass analysis system as claimed in claim 1 wherein said plurality of inner electrodes comprises:

a first generally cylindrical inner electrode having first and second arcuate gaps disposed opposite one another and along a length of said first inner electrode ;

a second inner electrode extending generally coextensive with said first arcuate gap;

a third inner electrode extending generally coextensive with said second arcuate gap, the first, second and third inner electrodes cooperating with said outer electrode to form a substantially circular ion trajectory path in the interstitial region between said outer electrode and said inner electrodes.

12. An ion selection apparatus for use in a mass analysis system, the ion selection apparatus comprising:

a first electrode having a cylindrical interior electrode surface;

a second electrode having an exterior electrode surface concentrically disposed with and facing said interior electrode surface of said first electrode, the exterior electrode surface of said second electrode being generally cylindrical with at least one arcuate gap disposed along a length thereof;

a third electrode having an exterior electrode surface concentrically disposed with and facing said interior electrode surface of said first electrode, the exterior electrode surface of said third electrode being generally coextensive with said arcuate gap of said second electrode;

a power supply system connected to said first, second and third electrodes, said power supply system providing a DC voltage between said interior electrode surface of said first electrode and said exterior electrode surface of said second electrode, said power supply system providing a switched DC voltage between said interior electrode surface of said first electrode and said exterior electrode surface of said third electrode.

13. A method for detecting ions of a predetermined mass-to-charge ratio in a mass analysis system, the method comprising:

generating a plurality of ions for analysis;

directing the plurality of ions into a stable ion trajectory within a substantially homogenous electric field;

introducing perturbations of said substantially homogenous electric field so that only ions of said predetermined mass-to-charge ratio remain in a stable trajectory within said electric field.

14. A method as claimed in claim reference claim 13 and further comprising the step of altering said substantially homogenous electric field so that said ions of said predetermined mass-to-charge ratio leave said stable trajectory.

15. A method for detecting ions as claimed in claim 14 and further comprising the step of detecting said ions of said predetermined mass-to-charge ratio as said ions leave said stable trajectory.

16. A method for detecting ions as claimed in claim 13 wherein said perturbations are periodic.

17. A method for detecting ions as claimed in claim 13 wherein said perturbations are generated by a switched DC voltage signal applied to one or more electrodes used to generate said generally homogenous electric field.

18. A method for detecting ions as claimed in claim 13 wherein said stable trajectory is substantially circular.

19. A method for detecting ions of a predetermined mass-to-charge ratio in a mass analysis system, the method comprising:

generating a plurality of ions for analysis;

directing the plurality of ions into an interstitial region formed in a concentric electrode arrangement, said concentric electrode arrangement comprising an exterior electrode having a generally cylindrical interior region and a plurality of interior electrodes arranged in a generally cylindrical manner in the interior region of said exterior electrode;

providing electrical power to said concentric electrode arrangement to generate a generally homogenous electric field in said interstitial region whereby said plurality of ions are directed into a substantially stable trajectory in said interstitial region;

varying said electric power to said concentric electrode arrangement to introduce perturbations in said substantially homogenous electric field whereby only ions of said predetermined mass-to-charge ratio remain in a stable trajectory within said electric field.

20. A method for detecting ions as claimed in claim 19 and further comprising the steps of:

further varying said electric power to said concentric electrode arrangement to alter said substantially homogenous electric field so that ions of said predetermined mass-to-charge ratio leave said stable trajectory; and

detecting said ions of said predetermined mass-to-charge ratio.

21. A method for detecting ions as claimed in claim 20 wherein the step of detecting said ions comprises detecting said ions of said predetermined mass-to-charge ratio as said ions of said predetermined mass-to-charge ratio contact the interior region of said exterior electrode after leaving said stable trajectory.

22. A method for detecting ions as claimed in claim 19 wherein said stable trajectory is substantially circular.

23. A method for detecting ions as claimed in claim 21 wherein said stable trajectory is substantially circular.